The Efficacy of Low-Level Laser Therapy for Pain Modulation
Christine Andrea SPT, Alexandra Ariste SPT, Allison Bartholomew SPT, Andrew Bartz SPT
Research Advisor: Michael Ross PT, DHSc
Department of Physical Therapy, Daemen College, Amherst, NY

Research Question
Does the combination of low-level laser therapy (LLLT) with traditional therapeutic approaches/exercises affect the pain levels and functional abilities of patients with plantar fasciitis, osteoarthritis, tendinopathy, or acute neck pain when compared to traditional care alone?

Background
Plantar fasciitis (PF) is one of the most common foot disorders in the adult population. It results from degenerative changes in plantar fascia, particularly observed near its attachment to calcaneal tuberosity. Although the exact pathology of PF is not known, it is often sought as a result of pulling force to plantar fascia due to excessive weight-bearing (being obese or overuse of the foot), biomechanical abnormalities of the foot, presence of calcaneal spur, and inconvenient shoe usage. The typical symptom of PF is sharp or stabbing pain, felt at the first step in morning or after a period of prolonged sitting, limiting daily activities and impairing the walking performance. Thus, treatment for PF potentially targets both reduction in pain occurring in weight-bearing conditions such as standing or walking, and improvement in walking ability. For a better management of PF, a combination therapy is suggested including exercise and orthotic support with a conservative approach of low level laser therapy. Therefore, the purpose of this study was to estimate the extent to which LLLT contributes to usual care to improve foot function and walking performance in patients with PF when followed up for 3 months than compared to usual care alone.

Outcomes Assessment
All four studies utilized low-level laser therapy to determine the effects of pain modulation. The effect is photobiological not thermal. LLLT can be used to modulate the inflammatory processes, impact muscle fatigue, muscle contraction, and energy consumption.

The Application Process of Low-Level Laser Therapy (Lamba et al.)

Author and Purpose
Lamba et al. 2017
To determine which combination therapy of low-level laser therapy (LLLT) with exercise and orthotic support contributes conservative care ability in a patient with plantar fasciitis (PF) when compared to usual care alone.

Exercise Interventions

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<thead>
<tr>
<th>Group</th>
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<tbody>
<tr>
<td>Group 1 (n=20)</td>
<td>Home exercise program</td>
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<tr>
<td>Group 2 (n=20)</td>
<td>Home exercise program</td>
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</tbody>
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Results
There was a significant improvement in VAS score at rest, during movement, and post-intervention; however, the LLLT group had a greater reduction in pain after 4 weeks of treatment.

Alghadir et al. 2014
To examine the effects of low-level laser therapy on pain function of subjects with Achilles tendinopathy (OA) of the knee.

Exercise Interventions

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<tr>
<td>Group 1 (n=20)</td>
<td>Hot packs for 20 minutes</td>
</tr>
<tr>
<td>Group 2 (n=20)</td>
<td>Hot packs for 20 minutes</td>
</tr>
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Results
There was a significant reduction in WOACOM scores in both groups; however, the LLLT group had a greater reduction after 4 weeks of treatment.

Stergioulas et al. 2015
To examine the effects of low-level laser therapy (LLLT) in combination with eccentric exercises (EEs) and compare them to the effects of EE alone in patients with Achilles tendinopathy.

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<td>Group 1 (n=20)</td>
<td>12 sets 12 reps with 1 minute break between sets</td>
</tr>
<tr>
<td>Group 2 (n=20)</td>
<td>12 sets 12 reps with 1 minute break between sets</td>
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Results
There was a significant reduction in pain over 12 weeks (p<0.001) for both groups; however, a larger reduction in pain was demonstrated in the LLLT and EE group.

Kostantinovic et al. 2010
The purpose of this study was to examine the effects of low-level laser therapy (LLLT) for pain relief and functionality in patients with acute neck/ankle pain and radiocapitellar.

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Results
There was a significant improvement in VAS score at rest, during movement, and post-intervention; however, the LLLT group had a greater reduction in pain after 4 weeks of treatment.

Analysis
Each of these four studies demonstrated that traditional therapeutic treatment (e.g., range of motion, stretching, and strengthening) was effective in reducing pain and improving functional abilities of patients with common orthopedic impairments. However, these studies also indicate that treatment involving low-level laser therapy was more efficacious than traditional treatment. Outcome measures assessing pain and function improved with greater amplitude than that of traditional treatment.

The greatest improvements in reducing pain and increasing functional abilities were demonstrated when low-level laser therapy was used in combination with traditional therapeutic treatments.

Conclusion
In conclusion, low-level laser therapy is a safe and effective modality to use for improving the function and pain levels of patients with chronic orthopedic disabilities such as plantar fasciitis, osteoarthritis, tendinopathy, and acute neck pain.

References